

A Pipetting Assembly for Withdrawing Clarified Solutions from a Centrifuge Rotor

High-speed centrifugation is the technique most generally applicable to the removal of particulate contaminants from protein or polymer solutions on which light scattering or viscosity measurements are to be made. Failure to obtain clean solutions is usually the result of awkward handling rather than inadequate centrifugation. In pipetting the solutions from the centrifuge tubes, extreme care is required to prevent disturbance of the stratified layers and remixing of the settled particles particularly in aqueous solvents. Remixing of the settled particles may be expected to occur whenever liquid is permitted to drain back into the centrifuge tube as may happen when the solution is pulled into a pipet by mouth or by the use of a hypodermic syringe. Care is also required in inserting the pipet into the solution and in keeping it stationary while the solution is being withdrawn. The system described here eliminates any disturbance of the solution from the above factors, and has proved to be reliable and rapid in pipetting clarified solutions of proteins and synthetic polymers for light scattering as well as viscosity measurements. Although designed principally for the pipetting of optically clarified solutions from the #30 and #40 rotors of the Spinco preparative centrifuge, the essentials of the design are also applicable to other types of rotors.

The principal features of the apparatus are shown in Figure 1. The smooth, regulated withdrawal of solution is accomplished by the flow of water from the reservoir (1) to which the pipet (6) is connected by a length of tubing. It is convenient to make this

connection by means of a glass tip (3) on the tubing from the reservoir which is inserted into a short piece of tubing (4) on the pipet. This permits the pipet, when filled, to be clamped off with a butterfly clamp and separated from the reservoir. The pipets themselves have tips made of 3 mm. o.d. tubing which will pass through the holes in the Spinco aluminum centrifuge caps after the screw threads in the stem of the cap are machined out. The components of the pipetting assembly are mounted on a $\frac{3}{4}$ " thick plywood board, 16" across the front and 12" wide.

The procedure which is used to pipet out the solutions is as follows: the rotor is carefully removed from the centrifuge and seated on a Teflon spindle (7) where it rests on a Teflon pad. The low frictional properties of Teflon permit the rotor to be turned smoothly as each successive tube is brought into position beneath the pipet guide (5). This guide is a piece of glass tubing somewhat larger than the bulb of the pipet, which is

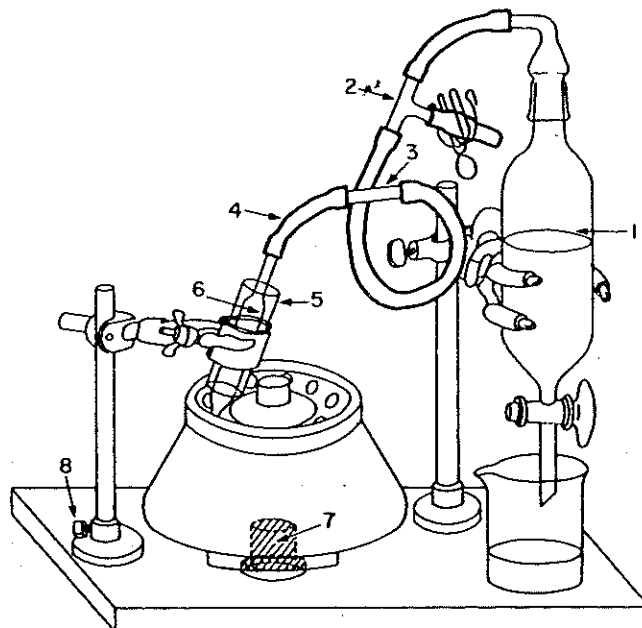


Fig. 1. Sketch of pipetting assembly.

set at the same angle as the tube well in the rotor. It may be pivoted out of the way when the rotor is put in place by loosening the screw on the base clamp (8). Now with the T-tube (2) open, the pipet is attached to the tubing leading to the reservoir and this is set at a slow flow rate. The pipet is inserted into the centrifuge tube, being guided down the wall of the pipet guide until the bulb of the pipet rests on the centrifuge cap. Closing the T-tube with a butterfly clamp starts the withdrawal of solution. When the pipet is filled to a predetermined level, it is sealed by a second clamp on the short piece of tubing (4) and disconnected from the tubing leading to the reservoir. The pipetted solution can now be used to make successive additions by weight to clarified solvent in a light-scattering cell or it can be transferred to a clean flask for use in viscosity measurements.

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